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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,751	04/13/2006	Arrigo Arletti	FE 6138 (US)	3905

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EXAMINER	
JANCA, ANDREW JOSEPH	
ART UNIT	PAPER NUMBER
1797	

MAIL DATE	DELIVERY MODE
08/02/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/575,751	ARLETTI ET AL.	
	Examiner	Art Unit	
	Andrew Janca	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,24 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,24 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Summary

1. In view of the appeal brief filed on 5/18/2010, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/Duane Smith/
Supervisory Patent Examiner, Art Unit 1797.

Response to Arguments

2. Appellants' argument (see for example Appeal Brief p 6) that Arletti do not teach a multistage process for the continuous production of an emulsion is persuasive. Arletti teach the production of an emulsion of a molten adduct of a magnesium dihalide-Lewis

base with an inert and immiscible liquid in rotor-stator device 1 and transferring of the emulsion through duct 14 into rotor-stator device 15; however, the final product of Arletti's process which leaves tank 15 is a dispersion of solid Mg dihalide particles in a liquid, not a liquid-liquid emulsion (figure 1; para 46).

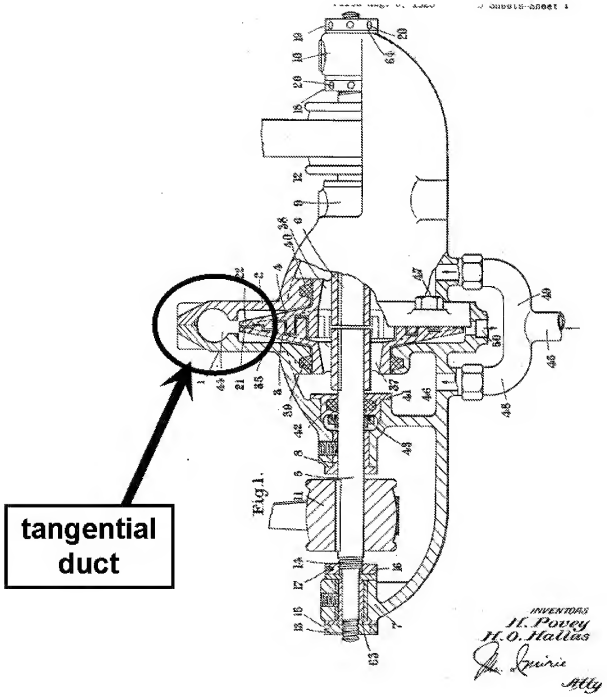
3. However, Arletti remains of relevance as a secondary reference, as cited in the new grounds of rejection below, because they teach 1) production of an emulsion in a first rotor-stator device, which may be the generic rotor-stator device cited in para 35 or the particular rotor-stator device 1 of figure 1; and 2) transport of the formed emulsion from rotor-stator device 1 through a duct 14, the transport being carried out such that a Reynolds number inside said duct may be higher than 3000 (para 40). As noted by Arletti, values of the Reynolds number above a "transition zone" of 2000-4000 are significant in that they "correspond to turbulent rather than laminar flow (para 0037)." As taught by Ferraris, having a Reynolds number in a duct high enough to produce conditions of turbulent flow, in particular above Re=3000 as taught by Arletti, is particularly suitable in maintaining an emulsified mixture in emulsified form during transport in the duct from one tank to another (2:9-15).

4. Regarding the argument that Arletti's tank 1 is not a rotor-stator device (for instance p 6 continuing), figure 1 depicts a rotor 4: a spinning stirring element is a rotor. Pipe 14, having a physical extent within stirring tank 1, necessarily acts as a stator: any projection or substantial irregularity within a tank which is static relative to a spinning stirring element acts as a baffle to disrupt fluid flow induced by the stirrer, and hence

contributes to a mixing effect. Since pipe 14 contributes to the mixing effect by disrupting fluid flow, and is static, it is a stator.

5. The remaining arguments concerning Arletti concern the second tank (p 7): as the second tank is not cited in the new grounds of rejection, these arguments are moot.

6. Regarding Appellants' argument that Povey teaches away from forming emulsions since Povey teaches the use of the apparatus for disintegrating solid materials (Brief p 8): as noted before, Povey also teaches the use of his apparatus for emulsifying liquids (1:13-14). That he teaches a multiplicity of uses for his device does not invalidate any one of them.



7. Regarding the argument bridging pp 8-9, it is difficult not to see how Povey's duct is not tangential (see annotated figure above). Povey's rotor-stator device is circular: the above figure depicts it in the plane; and duct 21-22-44 having an initial portion 21-22

lying along the circumference of rotor 3 necessarily meets channel 44 at a tangential point.

8. Regarding the argument against the combination with König (p 13), König teaches a residence time of about 1 second up to 10 minutes, whereas the claim recites a residence time of less than 1 second. There is a finite and small in context of the art number of options which it would be obvious for one of ordinary skill in the art to reasonably attempt in the course of routine optimization: 1) A residence time of between exactly one second and exactly 10 minutes; 2) A residence time around the lower limit, plus or minus 1 second; 3) A residence time around the upper limit, plus or minus 10 minutes. A teaching of a numerical limit invites variance in the neighborhood of the limit as part of the normal course of routine optimization: this invitation becomes a positive suggestion in the case where, like König, the limit is expressed not as an exact number but as a neighborhood by the word "about".

9. The remaining arguments of Appellants' brief repeat the arguments treated above as appropriate for the different permutations of the combination of prior art cited in the final rejection.

10. It is noted that Ferraris is cited on different grounds than the reference was on the first rejection. Ferraris is cited below only for the teaching of the appropriate Reynolds number in a connecting duct intended to communicate an emulsion.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1-5, 7-14, and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 1,489,786 to Povey et al in view of US 2,461,276 to Hetherington and US 2003/0096699 A1 by Arletti et al and US 4,469,649 to Ferraris et al.

14. With regard to claim 1, Povey et al teach a multistage process for the continuous production of an emulsion (1:11-14), the process comprising subjecting at least two immiscible liquids (else they would form a solution rather than an emulsion) to a sequence of one mixing stage in a stator-rotor device (2:65-75) comprising at least one rotor disk 3 (figure 1) and at least one stator (2:69-70), the at least one rotor disk having a peripheral velocity, wherein the emulsion exits the rotor-stator device by a peripheral

outlet 21-22-44 (2:1-28) to a duct comprising an initial portion where the fluids exit the rotor-stator arrangement and an end portion, the initial portion of the duct being oriented in a direction substantially tangential to the circumference of the rotor (1:105-2:28), and the peripheral velocity of each rotor of said stator-rotor devices ranges from 5 to 60 m/s (26 m/s: 2:32-33). Povey do not teach a second stator-rotor device, connected to the first, having a Reynolds number inside the connecting duct higher than 5000, where the duct connects to an axial inlet in the second rotor-stator device.

a. However, it would have been obvious to pass the emulsion through a second rotor-stator device to further emulsify the mixture: such would have been a duplication of parts obvious to one of ordinary skill in the art: see *In re Harza*, 274 F.2d 669, 124 USPQ 378 [CCPA 1960]; and to have passed the flow through the duct under conditions such that the Reynolds number was higher than 5000: the motivation would have been that to make the Reynolds number substantially less than 5000 such that the emulsion passed through the duct in partially or fully laminar flow rather than turbulent flow would have required making the duct very small, as in a microscale device, and Povey suggests dimensions for his device which are on the contrary quite large (2:32); and to have passed the flow into an axial inlet of the second rotor-stator device: the motivation would have been that Povey passes the material to be mixed into the first rotor-stator device into the device via axial inlets 37-38 (figure 1; 1:91-94).

b. Further, Hetherington teaches a multistage process for the continuous production of an emulsion (1:9-13), the process comprising subjecting at least

two immiscible liquids (1:9-13, 5:56-63) to a sequence of at least two mixing stages carried out in at least two successive stator-rotor devices each comprising at least one rotor disk 51, 52 and at least one stator 57, 58 (figure II; 4:37-63), the at least one rotor disk having a peripheral velocity, wherein a peripheral outlet 64 from a first stator-rotor device 51 is connected to an axial inlet 65 in a successive stator-rotor device 52 by means of a duct comprising an initial portion and an end portion, the initial portion of the duct being oriented in a direction substantially tangential to the circumference of the rotor 51 (see shaded duct in annotated figure II below). Hetherington and Povey are analogous arts, being from the same field of endeavor, emulsifying immiscible liquids. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to pass the emulsion of Povey through a second rotor-stator device, as does Hetherington: the motivation would have been to ensure a more complete degree of emulsion (Hetherington 3:56-75); and to have passed the emulsion from a peripheral outlet of the first rotor-stator device into an axial inlet of the second: the motivation would have been to pump the mixture through the multiple stages of the plural rotor-stator mixture by centrifugal pumping action (Hetherington 4:39).

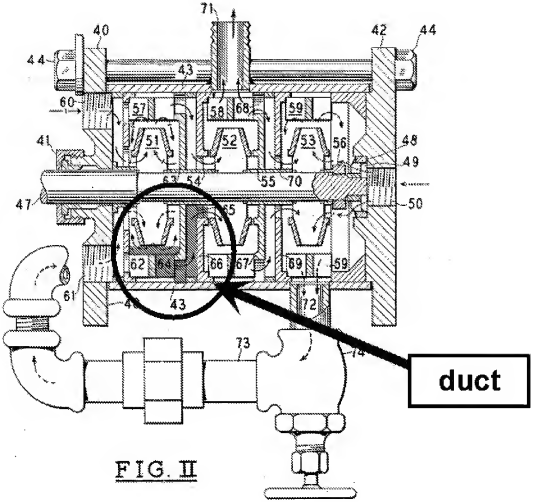


FIG. II

c. Further, in a process for the production of an emulsion, the process comprising subjecting at least two immiscible liquids (para 26) to a sequence of a mixing stage carried out in at a stator-rotor device 1 (figure 1) comprising at least one rotor blade 4 and at least one stator 14, the at least one rotor blade having a peripheral velocity, wherein a peripheral outlet 14 from a first stator-rotor device is connected to a second tank 15 for further processing by means of a duct 14 for communicating the formed emulsion comprising an initial portion and an end

portion, Arletti teaches that the Reynolds number Re_T inside said duct should be higher than 3000, and in particular may be higher than 5000 (para 24). Arletti teach 1) production of an emulsion in a first rotor-stator device; 2) transport of the formed emulsion from rotor-stator device 1 through a duct 14, the transport being carried out such that a Reynolds number inside said duct may be higher than 3000 (para 40). As noted by Arletti, values of the Reynolds number above a "transition zone" of 2000-4000 are significant in that they "correspond to turbulent rather than laminar flow (para 0037)." As taught by Ferraris, in a process for the production of an emulsion, the process comprising subjecting at least two immiscible liquids (1:67-2:1) to a mixing stage carried out in a stator-rotor device 20 (figure 1) comprising at least one rotor blade 16, the at least one rotor blade having a peripheral velocity, wherein a peripheral outlet 30 from a first stator-rotor device is connected to an axial inlet 30A in a successive stator-rotor device 40 for further processing by means of a duct 30-30A, it is important for keeping the material in the duct in an emulsified state that a Reynolds number Re_T inside said duct is higher than 3000 (2:14-15). Povey, Arletti, and Ferraris are analogous arts, being from the same field of endeavor, emulsifying immiscible liquids. It would have been obvious to one of ordinary skill to have kept the Reynolds number in the duct high, as do Arletti and Ferraris: the motivation would have been to keep the material in emulsion during its passage from one rotor-stator device to another: in particular, because keeping the Reynolds number in a duct above Re=3000 (which as taught by Arletti [para 37] and

Ferraris [2:9-15] is the threshold between laminar and turbulent flow) produces conditions of turbulent flow, which is more suitable in maintaining an emulsified mixture in emulsified form during transport in the duct from one tank to another than laminar flow (Ferraris 2:9-15). Further, it would have been obvious to choose the dimensions of the connecting duct and/or the speed or pressure of the fluid passed through, such that the Reynolds number is higher than 5000: for Arletti et al teach the Reynolds number in the duct as a variable desirable of optimization within the range of Re=3000-10,000 (Arletti et al para 40), and it would have been obvious to one of ordinary skill in the art to have optimized this result-effective variable.

15. The additional elements of claim 2, wherein said emulsion comprises, as a dispersed phase, a molten adduct of magnesium dihalide-Lewis base, are taught by Arletti et al (paras 17 and 22).

16. The additional elements of claim 3, wherein said emulsion comprises, as a continuous phase, a liquid which is inert and immiscible with said molten adduct of magnesium dihalide-Lewis base, are taught by Arletti et al (paras 17 and 26).

17. The additional elements of claim 4, wherein said inert and immiscible liquid is selected from aliphatic and aromatic hydrocarbons, silicone oils, liquid polymers or mixtures of said compounds, are taught by Arletti et al (para 26).

18. The additional elements of claim 5, wherein said molten adduct of magnesium dihalide-Lewis base may be fed to said first stator-rotor device at a weight ratio of less

than 0.5 with respect to said inert and immiscible liquid, are taught by Arletti et al (para 50).

19. The additional elements of claim 7, wherein the peripheral velocity of the at least one rotor disk is comprised in the range from 20 to 60 m/sec, are taught by Povey (2:32-33).

20. The additional elements of claim 8, wherein the Reynolds number Re_T inside said duct may be higher than 8000, are taught by Arletti et al (para 40).

21. The additional elements of claim 9, comprising a sequence of three mixing stages, are taught by Hetherington (figure II); and also by Povey (2:93).

22. The additional elements of claim 10, wherein said magnesium dihalide is magnesium chloride, are taught by Arletti et al (para 28).

23. The additional elements of claim 11, wherein said Lewis base is selected from amines, alcohols, esters, phenols, ethers, polyethers, aromatic or aliphatic (poly)carboxylic acids, are taught by Arletti et al (para 27).

24. The additional elements of claim 12, wherein said Lewis base is an alcohol of formula ROH, in which R is an alkyl group containing from 1 to 10 carbon atoms, are taught by Arletti et al (para 27).

25. The additional elements of claim 13, wherein the molten adduct is $MgCl_2.mROH.nH_2O$, wherein m=0.1-6.0, n=0-0.7 and R=alkyl group C_1-C_{10}, are taught by Arletti et al (paras 27, 29).

26. The additional elements of claim 14, wherein m=2.0-4.0, n=0-0.4 and R=ethyl group, are taught by Arletti et al (para 29).

27. The additional elements of claim 24, where the end portion 65 of the duct is oriented in a direction substantially parallel to the rotation axes of each rotor, is taught by Hetherington (figure II; 4:36-58); and is further obvious over Povey, who teach that the inlets 37-38 to the rotor should be axial (figure 1; 2:11-14).

28. The additional elements of claim 25, where rotation of the rotor forces the emulsion to flow from the rotor axis towards the peripheral rim of the rotor, are taught by Povey (2:15-23); and also by Hetherington (4:47-54).

29. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 1,489,786 to Povey et al in view of US 2,461,276 to Hetherington and US 2003/0096699 A1 by Arletti et al and US 4,469,649 to Ferraris et al, and further in view of US 4,089,835 to König et al. Povey, Hetherington, Arletti, and Ferraris do not explicitly teach that in each mixing stage a residence time is of less than 1 second. However, König et al teach a multistage process for the continuous production of a dispersion or emulsion (2:34-43, 10:35-48), the process comprising subjecting at least two immiscible liquids (2:34-43) to a sequence of at least two mixing stages carried out in at least two successive stator-rotor devices (10:35-48) each comprising at least one rotor blade and at least one stator (being both rotor-stator devices), the at least one rotor blade having a peripheral velocity (11:13-20); and further teach that the residence time in each mixing stage may be 1 second, and that the residence time is a variable desirable of optimization (10:35-48). It would have been obvious to one of ordinary skill in the art to make the residence time of the emulsion-mixing method of Arletti et al, Hetherington, and Povey on the order of 1 second, as do König et al: the motivation

would have been to use the mixing method to enhance chemical reactions between species carried in the emulsion having short reaction times (König et al 10:35-48); and it would further have been obvious to one of ordinary skill in the art to have optimized this result-effective variable.

Conclusion

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Janca whose telephone number is (571) 270-5550. The examiner can normally be reached on M-Th 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AJJ

/DAVID L. SORKIN/
Primary Examiner, Art Unit 1797